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Municipal Broadband: History's Guide

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Abstract: Over the past decade, an amazing trend has taken hold across the country—municipalities have begun providing Internet access to themselves and their citizens. Many areas of the United States, rural areas especially, are being left without privately provided Internet access. Those areas might consider a municipally-controlled alternative to private Internet service providers to prevent being left behind as the Internet increasingly becomes the means in which society communicates, participates, and influences. While benefits abound when municipalities provide Internet access, not every municipality should do so. Factual circumstances change from city to city. Many are, or can be, served adequately by private service providers, and that should be a consideration. Municipalities considering providing their own network should look to case studies to gain important insight. This article provides a small sampling of case studies that could provide such insight.

This article will detail the stories of five municipal networks and deduce lessons they can teach us. First, three "success" stories will be discussed: Bristol, Va., Corpus Christi, Tex., and Santa Monica, Cal. A discussion of the unsuccessful stories in Philadelphia, Pa., and St. Cloud, Fla. will follow. From these cases, lessons regarding business models and growth of the network can be gleaned. Both of these lessons are important to comprehend when determining whether to pursue a municipal broadband network, and both could cause the demise of the network if not handled

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carefully. After reading these case studies and giving the issues discussed herein full attention, municipalities can avoid repeating the same mistakes as before.

Those who cannot remember the past are condemned to repeat it.
–George Santayana

I. INTRODUCTION

Municipalities are an increasingly powerful force in the Internet access market. It goes without saying that Internet access can be the gateway to prosperity—the Internet provides a forum for democratic participation, education, local and national news, commerce, and other vital aspects of a functioning society and economy.[1] Indeed, infrastructure over which citizens access the Internet is increasingly being called essential—"an essential element of most economic activities around the world."[2] Where private providers fail (for lack of service, low quality service, slow access speeds, among other reasons), city governments often have the ability to provide that service in order to meet local needs.[3] Moreover, city government ownership over the network means the city controls the reins, can oversee the network, and can ensure that the network embodies the government's vision, including subscription rates, upgrades, and network neutrality. In that respect, municipalities have increasingly begun to experiment with providing high-speed Internet access for themselves and for their constituents.[4]

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[1] BRETT M. FRISCHMANN, INFRASTRUCTURE: THE SOCIAL VALUE OF SHARED RESOURCES 317-18, 336 (2012).

[2] *E.g.*, Fernando Beltran et al., *Internet as Critical Infrastructure: Lessons from the Backbone Experience in South America*, 58 COMMUNICATIONS & STRATEGIES 1, 2 (2005).

[3] FED. COMM. COMM'N, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN 153 (Apr. 8, 2011), http://download.broadband.gov/plan/national-broadband-plan.pdf. This issue often evokes comparisons to the early 20th century when private electric companies left rural areas without power. *See id.*; Edwin B. Parker, *Closing the Digital Divide in Rural America*, 24 TELECOMMUNICATIONS POL. 281, 282 (2000).

[4] Glasgow, Ky. was the first to create such a network in 1989. Steven C. Carlson, *A Historical, Economic, and Legal Analysis of Municipal Ownership of the Information Highway*, 25 RUTGERS COMPUTER & TECH. L.J. 1, 7-8 (1999). For a detailed look at Bristol, Va., Chattanooga, Tenn., and Lafayette, La.'s success with their municipal networks, see CHRISTOPHER MITCHELL, BROADBAND AT THE SPEED OF LIGHT (Apr. 2012), http://www.ilsr.org/wp-content/uploads/2012/04/muni-bb-speed-light.pdf.

There are several benefits to municipal provision of high-speed Internet access: local governments often need their own high-speed Internet access to provide other services to citizens and for internal operations; it can lead to significant economic development; and it can overcome the digital divide by providing universal service to all.[5] With these benefits, perhaps even the most expensive municipal broadband plan may be worth the investment.[6]

The accretion of municipal networks is not a coincidence. The communications marketplace has exhibited tremendous growth, but also tremendous consolidation as more and more subscribers have fewer and fewer choices for Internet service providers.[7] While this consolidation occurred, (both wired access and wireless access), two concomitant problems have taken place: first, rural areas are being ignored, almost completely, by private high-speed Internet providers (the "rural build-out problem"); and second, even some urban and densely populated areas have slow connections running on old technology.[8]

The rural build-out problem is significant. Put simply, the Internet access market can be described as a "natural" monopoly because of its high barriers to entry (up-front costs of building infrastructure) and

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[5] François Bar & Namkee Park, *Municipal Wi-Fi Networks: The Goals, Practices, and Policy Implications of the U.S. Case*, 61 COMMUNICATIONS & STRATEGIES 107, 111 (2006); Benjamin Lennett, *From the Digital Divide to Digital Excellence*, NEW AM. FOUND. (Feb. 1, 2011), http://newamerica.net/publications/policy/from_the_digital_divide_to_digital_excellence; "The Digital Divide refers to the gap between those who can benefit from digital technology and those that cannot." Craig Warren Smith, *"Digital Divide" Defined*, DIGITAL DIVIDE INST. (July 6, 2012), http://www.digitaldivide.org/digital-divide/digitaldividedefined/digitaldivide.

[6] The terms "high-speed Internet" and "broadband" will be used interchangeably unless noted otherwise.

[7] SUSAN P. CRAWFORD, CAPTIVE AUDIENCE: THE TELECOM INDUSTRY AND MONOPOLY POWER IN THE NEW GILDED AGE (2013); Susan P. Crawford, *The Communications Crisis in America*, 5 HARV. L. & POL. REV. 245, 248-9 (2011).

[8] While cable broadband has majority market share, *see* Om Malik, *In U.S. Broadband, Cable is Eating the Bells' Lunch*, GIGAOM (July 31, 2012), http://gigaom.com/2012/07/31/in-u-s-broadband-cable-is-eating-the-bells-lunch, a fiber-only architecture is "the only last-mile technology capable of meeting ultra high-speed needs. . . . [P]ushing fiber deeper into the network puts into place an infrastructure that has long-term strategic benefits." FEDERAL COMMUNICATIONS COMMISSION, THE BROADBAND AVAILABILITY GAP 76 (April 2010), *available at* http://download.broadband.gov/plan/the-broadband-availability-gap-obi-technical-paper-no-1.pdf.

declining marginal costs of adding new customers.[9] With high up-front costs, private providers are wary of building expensive infrastructure to serve rural areas where there is only a limited opportunity to recoup those costs. [10] Rural areas are generally unattractive to private providers because with only a few hundred to a few thousand potential subscribers, it would take a substantial amount of time to see a return on that investment. Many private companies are short-term, profit-driven entities, and therefore, infrastructure build-out to rural areas is less likely to happen.[11] This leaves many rural areas without much-needed high-speed Internet access. To solve that problem, municipalities are building their own networks.

The second problem mentioned above is that even urban and densely populated areas in the United States have slow access speeds. Recently, the United States ranked seventeenth in advertised broadband speeds among OECD countries.[12] While other areas of the world are being hooked up to fiber-to-the-home systems,[13] the United States, in many areas, is still beholden to the cable companies and their slow, out-of-date copper lines.[14] This means that as innovation at the edges of the Internet increasingly requires high-speed Internet access (video streaming websites such as YouTube and NetFlix, for

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[9] STUART MINOR BENJAMIN ET AL., TELECOMMUNICATIONS LAW AND POLICY 446-47 (2d ed. 2006); *see also* Mike Masnick, *Network Neutrality and Natural Monopolies*, TECHDIRT (Jan. 16, 2006, 10:28 AM), http://www.techdirt.com/articles/20060116/1028205.shtml. This characterization is up for debate, however; *But see* Thomas J. DiLorenzo, *The Myth of Natural Monopoly*, MISES INST. (May 13, 2011), http://mises.org/daily/5266.

[10] *See* Parker, *supra* note 3, at 282. Rural areas lack "economies of scale" due to their small market sizes.

11 Mitchell, supra note 4, at 50.

[12] OECD, *Average Advertised Download Speeds by Country*, ORG. ECON. COOPERATION & DEV. (Sept. 2011), http://www.oecd.org/dataoecd/10/53/39575086.xls.

[13] It is happening in Hong Kong, *see* Randall Stross, *Cheap, Ultrafast Broadband? Hong Kong Has It*, N.Y. TIMES (Mar. 5, 2011), http://www.nytimes.com/2011/03/06/business/06digi.html, Japan, Germany, and many others. Om Malik, *So Where Else in the World Can You Get 1 Gbps to the Home?*, GIGAOM (Feb. 11, 2010, 6:00 PM), http://gigaom.com/2010/02/11/so-where-else-in-the-world-can-you-get-1-gbps-to-the-home.

[14] Verizon FiOS is a 100% fiber-optic network, but plans to expand are non-existent and it currently covers only 14% of the United States. Karl Bode, *Verizon Again Confirms FiOS Expansion Is Over*, DSLREPORTS (Mar. 23, 2012), http://www.dslreports.com/shownews/Verizon-Again-Confirms-FiOS-Expansion-is-Over-118949.

example), those lacking the necessary connection will be left behind culturally, economically, and democratically.

Whether a municipality *should* provide its own broadband will require a fact-specific determination made after serious inquiry into many important issues.[15] In some instances, private Internet access providers satisfy most or all of the needs of its subscribers, including the municipality itself. Other times, private actors do not suffice. While the task of understanding how to begin planning a municipal broadband network may be "daunting,"[16] case studies can be a vital tool. There are important lessons to be learned from previous successful and failed attempts.

A municipality's success depends on a variety of factors. For instance, municipalities should be ready to respond to incumbents that fight mercilessly against any municipal broadband plan both in the courts and in the legislature.[17] Also, depending on how the municipality chooses to run the network, it should be prepared to interact with customers on a personalized basis, including for technical and business issues. While these issues (and others) present challenges to municipalities, empirical data show that municipalities can be very successful Internet providers. While some have met with problems, many have overcome them.

This paper will detail five municipal broadband case studies. While this is only a small cross-section of municipal broadband plans, these studies have lessons embedded within them that can provide important guidance for other municipalities.[18] First, three "success"

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[15] Some states, such as Virginia and Wisconsin, even require this study by law, called a "feasibility study." James Baller, *State Restrictions on Public Communications Initiatives (as of July 1, 2012)*, BALLER HERBST GRP. (July 1, 2012), http://baller.com/pdfs/BallerHerbstStateBarriers%287-1-12%29.pdf. However, one should be careful to avoid the trap of "study after study." They can be expensive and tell you information you already know. MITCHELL, *supra* note 4, at 55.

[16] Angsana Techatassanasoontorn et al., *Learning Processes in Municipal Broadband Projects: An Absorptive Capacity Perspective*, 34 TELECOMMUNICATIONS POL. 572, 584 (2010).

[17] *See generally* Eric Null, Legal and Political Challenges to Municipal Networks in the United States, *in* SOCIAL AND ECONOMIC EFFECTS OF COMMUNITY WIRELESS NETWORKS AND INFRASTRUCTURES 38-42 (Abdelnasser Abdelaal ed. 2013).

[18] This paper will not give a fine-grained analysis detailing specific steps municipalities should follow. For that, *see* Breitbart, *infra* note 114, at 31-3, MITCHELL, *supra* note 4, at 54-60, and NULL, *supra* note 17, at 42-44. Additionally, it should be noted that wireless and wired technologies are different, and both have their own quirks. This article will largely ignore the technical means by which municipalities provide Internet access, and

stories will be discussed: Bristol, Va., Corpus Christi, Tex., and Santa Monica, Cal. Next, the article will discuss the unsuccessful attempts at broadband networks in Philadelphia, Pa., and St. Cloud, Fla. Thereafter, this article will discuss the important lessons learned from these networks, including what they teach about business models and how to properly build-out the network.

II. SUCCESS STORIES

A. Bristol, Va.

In 1999, Bristol's phone provider, Bristol Virginia Utilities (BVU), built optical fiber connections for internal government use (so-called "I-nets") in response to a severe storm that shut the utility down.[19] As fiber-optic demand increased among local businesses and BVU realized additional capacity was available at a low cost, BVU expanded the program and began offering service for outside businesses.[20] In 2002, BVU expanded even further to provide home Internet service to Bristol citizens. As demand for the network increased, it quickly grew to eight counties to the north (the "Virginia Coalfield region"), encompassing a total of 250 miles of fiber backbone and 675 total miles of fiber plant infrastructure.[21] Like some other cities, BVU's offerings allow consumers to choose between multiple plans, including a triple-play package, which encompasses telephone, cable television (including Video-on-Demand), and broadband Internet.[22] If a customer chooses to subscribe only to broadband Internet, BVU offers different speeds and prices.[23] The wired service also powers free

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will simply refer to all networks as "municipal broadband networks" unless otherwise specified.

[19] MITCHELL, *supra* note 4, at 3.

[20] *Id.*

[21] Bradley Kramer, *Pioneering Spirit: Bristol, Va., Trailblazing Muni FTTH*, METASWITCH 22 (Mar. 2008), http://www.metaswitch.com/sites/default/files/case-study-bvu.pdf.

[22] *Municipal FTTH Deployment Snapshot – City of Bristol, Virginia, BVU OptiNet*, BROADBAND COMMUNITIES MAG. ONLINE, Aug.-Sept. 2008, http://www.bbpmag.com/snapshot/snap1002.php. For a list of municipalities offering triple-play packages, see *Municipal Broadband Systems Offering Triple Play*, AM. PUBLIC POWER ASSOC. (Dec. 2011), http://www.publicpower.org/files/PDFs/MunicipalBondTriplePlay.pdf.

[23] Andy Opsahl, *Municipal Broadband Efforts Succeed Despite Wi-Fi Meltdown*, GOV. TECH. (Apr. 27, 2009), http://www.govtech.com/pcio/Municipal-Broadband-Efforts-

Wi-Fi at Bristol's local mall and in local government buildings. That Wi-Fi signal, in some instances, reaches homes.[24] Seventy percent of Bristol's residents and businesses, or approximately 11,750 people, subscribe to the network.[25]

The city originally invested $21 million in the network through bonds and federal grants. It is expected to pay for itself in twelve to fifteen years.[26] Bristol has already seen significant direct benefits.[27] Large companies, including Northrop Grumman and CGI, have moved to nearby Lebanon, Va., in part because of BVU's one gigabit-per-second service.[28] These two companies alone brought 700 high-paying jobs to southwestern Virginia, with thirty percent of those positions being filled by local residents.[29] Moreover, BVU's services have been

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Succeed-Despite-Wi-Fi.html. For a list of tiers and prices for residential plans, see *Residential High-Speed Internet*, BVU, http://www.bvu-optinet.com/templates/default.php?purl=internet_res_hispeed&turl=inside_3col_std_template.htm (last visited Jan. 11, 2013).

[24] Opsahl, *supra* note 23.

[25] MITCHELL, *supra* note 4, at 3.

[26] Opsahl, *supra* note 23. The Virginia Tobacco Commission helped fund the program. *Infinera Case Study: BVU*, INFINERA 1 (2010), http://www.infinera.com/broadband/files/cs-bvu.pdf. While there were some debt-related problems early-on, those problems have been largely handled. BVU is currently $24 million in debt, but ran in the black earlier than expected, and has a $2.3 million rainy day fund. MITCHELL, *supra* note 4, at 7-10.

[27] This was apparently the goal: "BVU management was very conscious of the fact that the southwestern Virginia area was suffering from the decline of the local coalmining industry, rural poverty, and depopulation. They saw [fiber to the user] as a technology that could turn the region around and attract people and new industries." *Infinera Case Study: BVU*, *supra* note 26.

[28] *The Advantages of Optical Access*, FTTH COUNCIL 28 (Spring 2011), http://s.ftthcouncil.org/files/bbp_marapr_primer_-_2011.pdf. Northrop Grumman called BVU's investment "critical" to its decision. It also cited local universities and low cost of living as important. *Fibre in Paradise*, ECONOMIST (London) (Feb. 18, 2010), http://www.economist.com/node/15549324?story_id=15549324. Interestingly, Northrop Grumman required BVU to upgrade its network before agreeing to move. *Infinera Case Study*, *supra* note 26, at 1.

[29] MITCHELL, *supra* note 4, at 15; *Infinera Case Study*, *supra* note 26, at 3. Wes Rosenbalm, BVU CEO, stated the "average annual salary at the new data centers is around $50,000, compared with average per-capita income in the region of $20,000 (roughly half the US average)." *Id.*

instrumental in business retention. The coal giant, Alpha Natural Resources, stayed in Bristol partially because of BVU's service.[30]

BVU is embarking on an ambitious two-and-a-half year project to expand the network.[31] The goal is a 388-mile fiber network that will serve the greater Southwestern Virginia area with fiber that can reach ten gigabits-per-second.[32] The expansion will enable the network to reach 120 anchor institutes such as "schools, libraries, hospitals, clinics, major government facilities and other large public facilities."[33] It will also make last-mile service possible for 18,000 homes and 500 businesses. The project is funded by the 2009 stimulus bill for over $22 million and more than $5 million from the Virginia Tobacco Commission.[34] Currently, the city has invested or received in grants approximately $80 million for the project.[35]

Increasing the number of jobs and the median pay in the area is a tremendous economic benefit, but social benefits abound as well. The Wellmont Health System uses the network for its "cardiac tele-health system." The tele-health system allows patients in any of eight health centers to send, via network connection, x-rays and other test results to experts in the Tennessee Medical Center. With that information, doctors and patients can video conference without the need to

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[30] James Lardner, *Wave of the Future?*, REMAPPING DEBATE 1-2 (May 25, 2011), http://www.remappingdebate.org/sites/all/files/Wave%20of%20the%20future_1.pdf.

[31] Charles Owens, *Stimulus Funding to Stretch Broadband Through 8 Va. Counties*, BLUEFIELD DAILY TELEGRAPH (July 3, 2010), http://bdtonline.com/local/x1671038013/Stimulus-funding-to-stretch-broadband-through-8-Va-counties. Though, BVU has been expanding and upgrading the network since inception. *See, e.g.*, *Connecting Rhythm & Rooters*, BVUPDATE MAG. (Fall 2011), http://www.bvu-optinet.com/data_elements/BVU_Update_Fall2011_web.pdf.

[32] Eric Slack, *Bristol Virginia Utilities: Constant Change*, ENERGY TODAY MAG. (July 1, 2011), http://www.energytodaymagazine.com/index.php?option=com_content&view=article&id=7255:bristol-virginia-utilities-constant-change&catid=151:utilities-generation-transmission&Itemid=195.

[33] Christopher Mitchell, *Bristol Gets Stimulus Funds for Middle Mile and Starts Smart Grid*, MUNINETWORKS (July 14, 2010), http://www.muninetworks.org/content/bristol-gets-stimulus-funds-middle-mile-and-starts-smart-grid (quoting former United States Representative Frederick Boucher).

[34] *Id.*

[35] MITCHELL, *supra* note 4, at 2.

transport patients between hospitals.[36] The hospitals even use municipal Internet access as a selling point to its potential employees.[37]

Increased localism is another social benefit. BVU employs local citizens. Thus, when BVU subscribers call seeking customer support, they know they are speaking to a fellow local citizen who actually cares about solving the problem.[38] This means municipalities can avoid the general distaste and distrust of the telecommunications industry—six of the fifteen most disliked companies in the United States are telecommunications companies.[39] This gives a competitive advantage to municipalities. BVU has spared no expense training its employees too. It houses a 24/7 call center and, over nine months, has "cross-train[ed] all of its customer service representatives in broadband, cable television, and telephone services in addition to the usual utility services with which they were already familiar . . ."[40]

Lastly, as mentioned above, the wired connection powers a free Wi-Fi service that reaches government buildings, the local mall, and some residents.[41] Free Wi-Fi service is not just convenient; it can help bridge the digital divide by allowing lower income individuals to access the Internet for free, it can increase student access and learning, and it can reduce residential telecommunications costs. Additionally, some areas in southwestern Virginia would be without 4G signals if it were not for BVU.[42]

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[36] *Infinera Case Study*, *supra* note 26, at 3-4. This system benefits low-income patients by saving them travel costs, but also brings "expertise . . . to areas that do not have that expertise." *Id.* at 4.

[37] *Id.* at 4.

[38] Kramer, *supra* note 21, at 24.

[39] Dina Spector, Gus Lubin & Vivian Giang, *The 15 Most Disliked Companies in America*, BUS. INSIDER (June 22, 2012, 1:41 PM), http://www.businessinsider.com/the-most-hated-companies-in-america-2012-6?op=1 (increasing in hatred: DirecTV, CenturyLink, Cox Communications, Time Warner Cable, Comcast, Charter Communications). It should be noted that municipal utilities have topped the list (Northeast Utilities, Long Island Power Authority). However, Bristol and Chattanooga have both overcome such dislike by offering quality service.

[40] MITCHELL, *supra* note 4, at 11.

[41] Opsahl, *supra* note 23.

[42] MITCHELL, *supra* note 4, at 13.

The municipal broadband program in Bristol is known for its success.[43] BVU's CEO, Wes Rosenbalm, attributes its success to fulfilling a community need rather than seeking novelty.[44] Because private companies were not likely to build high-speed Internet infrastructure in Bristol of their own volition, the primary viable actor available to meet that community need was the municipality itself.[45]

Success did not come without a fight. BVU was subject to numerous legal battles. Incumbents fought "tooth and nail" to stop BVU.[46] Bristol incurred an unexpected $2.5 million in legal fees.[47] Virginia law, as of 2001, prevented municipalities from providing telecommunications services.[48] BVU sued the state and won, repealing the law. After, BVU successfully worked with the legislature to pass a bill that affirmatively gave Bristol the ability to provide telecom services.[49] BVU then had its service launch delayed by Charter Communications, the cable TV incumbent, when Charter sought and won an injunction preventing BVU from supplying its fiber service. Virginia legislators again saved the utility by passing a law explicitly authorizing BVU to offer cable TV services.[50] Sprint, a telephone incumbent, filed a petition with the Virginia State Corporation Commission seeking to preclude BVU from offering phone services

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[43] It was the only U.S. city listed on the Intelligent Community Forum's list of Top Seven Intelligent Communities of 2009. *Id.* In addition, Bristol also won the 2008 *Last Mile* Smart Community Award for municipalities with fewer than 200,000 people. Kramer, *supra* note 21, at 22. *Last Mile* magazine does not exist anymore.

[44] Opsahl, *supra* note 23.

[45] *Id.*

[46] David Chaffee & Mitchell Shapiro, MUNICIPAL & UTILITY GUIDEBOOK TO BRINGING BROADBAND FIBER OPTICS TO YOUR COMMUNITY, PUB. TECH. INST., 18 (2008), http://www.pti.org/docs-cio/Municipal&UtilityGuidebook.PDF.

[47] MITCHELL, *supra* note 4, at 4.

[48] CHAFFEE, *supra* note 46, at 19.

[49] *Id.*

[50] *Id.* Unfortunately, that bill also erected barriers for any other municipality to build its own network, and merely grandfathered Bristol in. Baller, *supra* note 15, at 4.

because Sprint thought BVU was subsidizing its telephone rates.[51] The Commission denied Sprint's request.[52]

Despite tremendous opposition, BVU was able to grow from a utility providing network services to the municipality to a multi-faceted utility providing the city of Bristol with a competitive option for wired and wireless broadband, cable TV, and telephone.[53] The option has kept businesses from moving out of the city, has brought new business, and has been recognized for its success. Bristol created an organization called FOCUS (Finding Opportunities for Communities throughout the United States), "a business unit offering advanced IT consulting, operations and management services to municipal entities globally."[54] Not only can other municipalities learn from Bristol's case study, but they can contact FOCUS for consultation services.

B. *Corpus Christi, Tex.*

Corpus Christi is home to 300,000 people.[55] Its plan to provide free Wi-Fi to the entire city was ambitious. The city's hard work resulted in a plan that, at one time, was heralded as the most successful municipal wireless program.[56] After a meter reader was attacked by a dog, the city decided it needed a new way to read meters.[57] In 2002, the city invested $7.1 million in a 147-square-mile

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[51] MITCHELL, *supra* note 4, at 4.

[52] CHAFFEE, *supra* note 46, at 19. However, as part of the deal, BVU needed to provide studies to the Commission to prove its prices complied with state law. *Id.*

[53] For a comparison of BVU, Charter, and Sprint's subscription rates for cable and telephone (respectively), *see* MITCHELL, *supra* note 4, at 5. One can see that in almost every category, BVU's prices were lower than the incumbent's. Even where they were not, "OptiNet customers said it would take a big swing in prices to make them switch back to Charter." *Id.* at 6.

[54] Press Release, Bristol Virginia Utilities Launches New Business Unit, Announces First Customer, Aug. 16, 2007, *available at* http://www.accessbristolva.com/images/081607_FOCUS_press.pdf.

[55] Kristina Dell, *Welcome to Wi-Fi-Ville*, TIME MAGAZINE (Jan. 5, 2007), http://www.time.com/time/magazine/article/0,9171,1574164,00.html.

[56] Steven Titch, *Corpus Christi Shows Way to Muni Success*, HEARTLANDER (Nov. 1, 2007), http://news.heartland.org/newspaper-article/2007/11/01/corpus-christi-shows-way-muni-success [hereinafter Titch, *Corpus Christi*].

[57] Dell, *supra* note 55.

mesh Wi-Fi network.[58] It was originally designed to allow the municipality to read power meters electronically.[59] At the time, EarthLink was interested in partnering with municipalities to provide wireless service to consumers.[60] It bought the mesh Wi-Fi system from Corpus Christi for $5.2 million (to be paid in two installments) hoping to monetize the network through subscription Internet services.[61] EarthLink offered service for $20 per month.[62] However, within a few years EarthLink learned that it could not profit from this business model. In 2008, it gave the system back to Corpus Christi with $2.5 million in enhancements and equipment. In return, Corpus Christi abated the second installment payment.[63] This left the city with a vastly improved network that it could now use for its own purposes.[64]

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[58] Opsahl, *supra* note 23. In a typical wireless network, centralized routers propagate signals, and those within range receive the signal and also propagate it. Mesh wireless networks create mini-routers out of each individual device on the network. Christian Sandvig, *Spectrum Miscreants, Vigilantes, and Kangaroo Courts: The Return of the Wireless Wars*, 63 FED. COMM. L.J. 481, 491 n.44 (2011).

[59] Heather Clancy, *Corpus Christi Pushes Envelope with Municipal Wireless*, SMARTPLANET (July 28, 2010, 5:19 AM), http://www.smartplanet.com/blog/business-brains/corpus-christi-pushes-envelope-with-municipal-wireless/8863 (Corpus Christi's wireless system is second only to Oklahoma City in size).

[60] EarthLink partnered with various municipalities, including Philadelphia and Corpus Christi, but pulled out of the market entirely in 2008. Shane McGlaun, *Municipal Wi-Fi Failing, EarthLink Pulls Out*, DAILYTECH (Mar. 24, 2008, 2:20 PM), http://www.dailytech.com/Municipal+WiFi+Failing+Earthlink+Pulls+Out/article11211.htm.

[61] Opsahl, *supra* note 23. The first installment was $3.5 million, and the second installment was $1.7 million. *Id.*

[62] Kristin Kloberdanz, *Whither Municipal Wi-Fi?*, FASTCOMPANY (Apr. 2, 2008), http://www.fastcompany.com/magazine/124/whither-municipal-wi-fi.html.

[63] Opsahl, *supra* note 23. The city netted $800,000 from the deal ($2.5 million in new equipment minus $1.7 million it was owed for the network on the second installment).

[64] John Sendejar, general manager of ConnectCC, the city's Wi-Fi program, described it as "a pretty sweet deal." *Id.* But he has also described it as "unceremonious[]," especially given the lack of coherent organization or ability to oversee the operation. Sendejar was not able to determine what equipment worked and did not work, and the only documentation he received was a Microsoft Excel spreadsheet with 1300 access points listed on it. Susan Nunziata, *Mesh Network Is Key to Corpus Christi's Mobile Worker Program*, MOBILE ENTERPRISE (Mar. 4, 2009), http://mobileenterprise.edgl.com/top-stories/Mesh-Network-Is-Key-To-Corpus-Christi-s-Mobile-Worker-Program60556.

Originally, the city did not view its primary goal as bridging the digital divide, nor was the city interested in providing service to people's homes.[65] It was one piece of a much larger city-wide information technology overhaul. It was designed to increase efficiency by improving services and cutting costs by "migrating time- and paper-intensive work to a wireless network."[66] In other words, it was designed to avoid dog bites.

The city wanted to align agency interests (police, fire, education, and licensing) such that a single network could meet their business needs.[67] John Sendejar, now General Manager of ConnectCC, the company in charge of the city's Wi-Fi program, went "department by department to see where [the city could] increase productivity by using the . . . network."[68] The city's plan for meter reading required only ten percent of the network's total capacity.[69] Ninety percent of the capacity was leftover for other uses. To ensure the network would be used in the public interest, the city founded the Corpus Christi Digital Community Development Corporation (CCDCDC), a non-profit group that

> primarily looks to develop e-government applications that give the Wi-Fi network and Internet connectivity broader appeal across larger portions of the population. While this may include free connectivity and training, it also involves ways to make it easier for citizens to work with city government, such as using Web applications to fill out forms that would otherwise require a trip downtown, file theft reports, pay taxes and fees, and perform other transactions.[70]

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[65] Titch, *Corpus Christi*, *supra* note 56.

[66] *Id.*

[67] *Id.*

[68] Press Release, Tropos Networks, City of Corpus Christi Extends Tropos Wireless Broadband Network to Improve Traffic Management and Public Safety During Spring Break (Mar. 30, 2010), *available at* http://www.tropos.com/news/pressreleases/3_30_2010.php.

[69] Clancy, *supra* note 59.

[70] Titch, Corpus Christi, supra note 56. The CCDCDC has since been renamed "ConnectCC." For more information, visit http://www.connectcc.com.

The network is now used for much more than just meter reading. It is used for tracking emergency vehicles to find the closest unit to an emergency and sending architectural plans wirelessly to computers in fire trucks to aid firefighters and increase their safety.[71] Even more fine-grained information can be provided, such as the exact location of firefighters inside burning buildings, monitoring the amount of air left in firefighters' air tanks, or the ability to stream video from the scene of an emergency.[72] The network is also used for monitoring traffic and public safety (via wireless video cameras) during Corpus Christi's busy spring break.[73] There are at least thirty cameras, with plans to increase that number to 150. The city planned to use the network to track evacuees in the event of a hurricane, a troubling danger for a coastal city.[74] Similarly, the cameras were used (unexpectedly, at the time) to track the progress of Hurricane Alex in June 2010.[75] The city also upgraded the wireless equipment to provide Wi-Fi signals to beach-goers.[76] As of 2010, there were at least thirty hot-spots in the city.[77] In

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[71] Steven Titch, *Municipal Wireless Supports Corpus Christi's Public Safety*, SECURITY PRODUCTS (Oct. 23, 2007), http://secprodonline.com/articles/2007/10/23/municipal-wireless-supports.aspx [hereinafter Titch, *Municipal Wireless*].

[72] *Id.* For more potential uses, including wireless transmission for restaurant inspectors, utility workers, water crews, and a hot-spot at the local sports arena, see Nunziata, *supra* note 64.

[73] Esme Vos, *Corpus Christi, Texas Muni Wi-Fi Welcomes Spring Break*, MUNIWIRELESS (Mar. 30, 2010), http://www.muniwireless.com/2010/03/30/corpus-christi-muni-wifi-welcomes-spring-break. Corpus Christi is a popular spring break destination because of its plentiful beaches. The program appears to have been a success. Tropos Press Release, *supra* note 68.

[74] Titch, *Municipal Wireless*, *supra* note 71.

[75] Clancy, *supra* note 59 ("[W]hen Hurricane Alex was brewing in the Gulf, the city realized the cameras could be used for another purpose: to track the progress of the hurricane."). There were only six cameras at that time. *Id.* However, with increased municipally-sponsored surveillance, other problems, such as privacy and freedom of information, have become evident. *See generally* E. Casey Lide, *Balancing the Benefits and Privacy Concerns of Municipal Broadband Applications*, 11 N.Y.U. J. LEGIS. & PUB. POL. 467 (2008).

[76] Vos, *supra* note 73.

[77] Clancy, *supra* note 59.

addition, economic benefits exist: long term city costs have been reduced, effectively, by fifty million over the next twenty years.[78]

With concerted effort and a little luck, Corpus Christi was able to take its internal network and transform it into a thriving wireless network for public use. The city takes its public interest obligation seriously. Through the creation of ConnectCC, and the city's emphasis on public safety (e.g., wireless video cameras) and government efficiencies (e.g., wireless meter reading), it is providing a true public benefit for its citizens.

C. *Santa Monica, Cal.*

Santa Monica provides high-speed fiber to government agencies and businesses (*not* directly to residents) at up to ten gigabits-per-second through its provider, City Net.[79] In 2002, the city originally invested $530,000 in the local TV operator to overbuild (meaning build a second network in the same area) for municipal use (an I-net). The resulting network housed more capacity than the city needed in the near-term.[80] Therefore, once the city determined its needs, it was able to lease its leftover "dark" capacity—unused capacity[81]—to large companies that wanted a dedicated connection to the backbone. Getting to that point took careful planning and strategy.

Confronted with high broadband costs, as well as increasingly expensive private subscription rates, the city decided to provide its own network. The program went through extensive planning that

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[78] *See Tropos Case Study: Corpus Christi Pioneers Metro-Wide Wi-Fi Mesh*, TROPOS 4 (July 2007), http://www.tropos.com/pdf/case_studies/tropos_casestudy_corpus_christi.pdf ("Overall, the city spent around $20 million for their [Automatic Meter Readers] and Wi-Fi network which provides a $30 million savings *over* the estimated $50 million that they would have spent over the next 20 years with an AMR system.") (emphasis added).

[79] Christopher Mitchell, *More Details from the Incredible Santa Monica City Net*, MUNINETWORKS (Aug. 25, 2011), http://www.muninetworks.org/content/more-details-incredible-santa-monica-city-net.

[80] Masha Zager, *Santa Monica City Net: How to Grow a Network*, BROADBAND PROPERTIES MAG. 44 (May/June 2011,), *available at* http://www.bbpmag.com/2011mags/mayjune11/BBC_MayJun11_SantaMonica.pdf.

[81] Rebecca Kheel, *What Lies Beneath*, SANTA MONICA DAILY PRESS (July 26, 2010), http://www.smdp.com/Articles-c-2010-07-25-70024.113116-What-lies-beneath.html. Used fiber is "lit." *Id.*

began soon after the passage of the Telecommunications Act of 1996.[82] City officials discussed with incumbents whether they would reduce prices, or, if not, whether the city would build the network itself.[83] Falling short of a satisfactory resolution, Jory Wolf, Santa Monica's Chief Information Officer, began vigorously pursuing a municipal high-speed network, to include "video, data, voice, cable, wireless and other services."[84]

A piecemeal build-out approach worked well for Santa Monica. After the city built the I-net, it immediately noticed annual savings of $400,000. The new system increased government efficiency by allowing for remote tasks such as "traffic surveillance, traffic signal synchronization, real-time parking advisories, real-time mass transit signs and security cameras."[85] Within a few years, the savings grew to $500,000 per year.[86] The city then reinvested $500,000 into building its own ten gigabit-per-second fiber-optic network.[87] Because the city owned the fiber and had built more capacity than it needed, it began leasing its dark fiber. This created a new revenue stream for the city while giving local businesses more, and cheaper, options.[88]

Before the municipal network was implemented, incumbent cable operators served businesses in most areas in Santa Monica. However, businesses could not find ultra-high-speed Internet access (100 megabits-per-second) with a private provider offered below $3,500 per month—a price that further inspired the city to invest in its own

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[82] Zager, *supra* note 80, at 44.

[83] *Id.*; Ryan Singel, *Hey, Google Fiber Losers: Built It Yourselves*, WIRED (Apr. 8, 2010), http://www.wired.com/epicenter/2010/04/google-fiber-losers ("Santa Monica avoided a fight with Verizon . . . by going to the company and asking if they would build such a network – and then when they said no, built it themselves.").

[84] Zager, *supra* note 80, at 44.

[85] *Id.* at 45.

[86] *Id.*

[87] Santa Monica Application for 2011 Better Government Competition, PIONEER MUNISHARE, 3, http://www.pioneermunishare.org/download.php?download_file=all_reports/2011_08_17__11_43_21__73-Santa%20Monica%20City%20Net-%20(Gary%20Carter).doc [hereinafter SM Application] (last visited Jan. 11, 2013) (on file with author).

[88] *Id.* Apparently the plan to lease dark fiber was pushed forward six months to a year because Google inquired about leasing some of Santa Monica's dark fiber in 2006. Kheel, *supra* note 81.

network and provide access at a lower rate. The resulting program was extraordinarily successful. The city financed the construction of a fiber backbone, but the backbone was connected only to municipal premises, not to local businesses. In order for local businesses to join, the businesses needed to connect to that backbone. For the same reason infrastructure build-out is expensive for private companies, the build-out costs for this expansion would also be significant for the city. Santa Monica's solution was to make the initial build-out investment to the local business premises, but it also required the newly connected business to reimburse the city those costs.[89] In effect, the city gets no-cost (to it) build-out of the network. Businesses can afford to reimburse the city because the businesses save 67.6 percent on their broadband rates, a savings of approximately $3,380 per month.[90] These lower monthly costs provide enough long-term cost-savings to justify the high up-front build-out costs.[91]

Revenues from leasing dark fiber total approximately $680,000 per year.[92] While this is not insignificant revenue, leasing dark fiber was never intended to be a substantial source of income. Neighbor Burbank, California also leases its dark fiber, and receives an approximated $1 million per year in revenue.[93] Nevertheless, the revenue from leasing dark fiber fully funds network operations and maintenance and supports many free Wi-Fi hot spots throughout the city.[94] In the future, the city plans to expand even more; currently, the network represents about sixty percent of the total planned area.[95]

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[89] Zager, *supra* note 80, at 45. The city has a "revolving capital improvement project account" of $190,000. That account provides the build-out investment that is then reimbursed by the purchasing business. *Id.* at 46.

[90] SM Application, *supra* note 87, at 4. It should be noted that businesses usually pay high up-front costs for high-speed connections regardless of provider, because businesses usually require much more capacity than the average individual.

[91] Zager, *supra* note 80, at 45.

[92] SM Application, *supra* note 87, at 4.

[93] Kheel, *supra* note 81.

[94] SM Application, *supra* note 87, at 4. *See also* Zager, *supra* note 80, at 46 (there are Wi-Fi hotspots in parks, beaches, libraries, public buildings, and other open-space areas). Each day about 2000 of Santa Monica's 87,000 residents use the twenty-seven hot spots. *Id.*

[95] Zager, *supra* note 80, at 46.

Word-of-mouth advertising originally drove new subscriptions. Today, the city markets its services and its customer retention rate is one hundred percent. The network itself is open access—available to competitors. At first, competitors chose not to use the city's network largely because providers would not be able to control the network. After seeing the network's success, two providers began offering their services over the city's network.[96]

To "assess customer demand for dark fiber leasing," the city surveyed businesses in Santa Monica in November 2008.[97] The responses indicated that a majority of businesses within two hundred feet of the city's fiber did not need a ten gigabit-per-second connection.[98] In November 2009, the city responded to this problem by leasing fiber from One Wilshire, a "leading global internet exchange" in Los Angeles.[99] With the less expensive and slower leased line, smaller businesses in Santa Monica had more appropriate options from which to choose.[100] These city-provided options cost businesses seventy percent less than the same service with an incumbent local exchange carrier.[101] Now, smaller businesses were not priced out of the market.

As a result of Santa Monica's service, competitors were forced to lower prices. Prices have dropped twenty percent or more for independent service providers (that is, service providers not using the city's open access network).[102] As Wolf stated, "[i]f that's all we had accomplished, we'd feel that we'd done what we intended."[103] In addition, the low-cost fiber is a draw for businesses when high rents would otherwise deter them.[104] High-speed Internet is a selling point even for the Fairmont Hotel Santa Monica, a luxury hotel providing 100 megabit-per-second connections to its patrons. The hotel sells

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[96] *Id.*

[97] SM Application, *supra* note 87, at 7.

[98] *Id.*

[99] *Id.*

[100] Zager, *supra* note 80, at 45-46.

[101] SM Application, *supra* note 87, at 7.

[102] Zager, *supra* note 80, at 46.

[103] *Id.*

[104] *Id.* at 47.

itself as tech-friendly, suitable for technology conventions and media production—a significant advantage in southern California.[105]

Unsurprisingly, Santa Monica's network creates social benefits in addition to the economic benefits outlined above. As discussed, some hotels provide patrons with high-speed Internet access. For one particular and common southern California patron type (film directors), free and fast Internet access is a significant advantage. Directors, with high-speed access to the Internet, can forward daily footage to the studio via high-speed access rather than the current system of physically mailing hard drives via courier or jet.[106] Furthermore, the UCLA Santa Monica Medical Center has implemented a tele-medicine program similar to the Wellmont Health System program in Bristol, Va. The medical center connects to its main site, and "also works with U.S. military services to offer tele-medicine and virtual surgical procedures to troops stationed abroad."[107] Lastly, the Internet access supports free public Wi-Fi, improving the quality of life of citizens.[108] This gives free access to regional college students and professors for educational projects and research.[109] As Wolf said, "[i]t all goes back to the community."[110]

Like Bristol's OptiNet, City Net has been nationally recognized with awards from the Public Technology Institute and Harvard's Kennedy School of Government.[111] Burbank and Long Beach, Ca., have launched similar projects. These initiatives could potentially lead to a regional municipal fiber network, with each community network connecting to the other for maximum benefit. Other cities seeking to emulate the program have consulted Santa Monica; though Wolf says that *his* program is most likely to succeed "in cities whose municipal buildings are located reasonably close to one another and that are within about 50 miles of global data centers with access to competitive

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[105] *Id.*

[106] *Id.*

[107] *Id.*

[108] Christopher Mitchell, *Publicly Owned Fiber Connects Hollywood Studios*, MUNINETWORKS (July 28, 2010), http://www.muninetworks.org/content/publicly-owned-fiber-connects-hollywood-studios.

[109] SM Application, *supra* note 87, at 5-6.

[110] Kheel, *supra* note 81.

[111] Zager, *supra* note 80, at 47.

broadband options."[112] Therefore, before adopting Santa Monica's plan, a municipality must make the determination that the plan will work for it. In addition, a city must "forecast savings based upon implementation of an advanced fiber optic infrastructure, complete[] a cost/benefit analysis and build[] infrastructure where financials net zero or a greater return."[113] Thus, while Santa Monica had tremendous success with its plan, it recognizes that there is no one-size-fits-all approach, and that each municipality must determine which path is right for it.

III. UNSUCCESSFUL STORIES

A. *Philadelphia, Pa.*

In 2004, public officials in Philadelphia began planning a city-wide wireless network.[114] Then-Mayor John Street created the Wireless Philadelphia Executive Committee to help determine the best way to deploy the digital infrastructure.[115] That committee was "to develop a public and private partnership to achieve wireless access throughout the City."[116] Despite the public's lack of awareness of the issues and its lack of information regarding such an ambitious project, the executive committee held town meetings to give the public a voice.[117] These public meetings led the committee to consider business models other than the public-private partnership, including private ownership, public ownership, nonprofit ownership, and the "civic wireless model."[118] After reviewing all of the business models, the

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[112] *Id.*

[113] SM Application, *supra* note 87, at 2-3.

[114] Joshua Breitbart, *The Philadelphia Story: Learning from a Municipal Wireless Pioneer*, NEW AM. FOUND. 9 (Dec. 11, 2007), http://www.newamerica.net/files/NAF_PhilWireless_report.pdf.

[115] *Id.* at 10.

[116] *Id.*

[117] *Id.* at 12, 14. Philadelphians may have suffered as a result of Philadelphia being an early-adopter; there was not much opportunity for the citizens to learn what was going on or to learn the full extent of the program. *Id.*

[118] *Id.* at 13. The Civic Wireless Model "offers free access paid for by the city or a civic entity." *Id.*

executive committee recommended a public-private partnership.[119] However, the city ultimately ignored the suggestion. It decided to pursue a purely private model largely because EarthLink agreed to build and maintain the network at its own expense.[120]

EarthLink's generous proposal to build and maintain the network at its own expense meant the city could use its now-freed funds for other purposes. The city instituted various digital inclusion initiatives designed to bridge the digital divide. One of the initiatives was the "T.E.A.C.H.," or "training, education, access, content, and hardware" program, which provided free computers, software, and training to those in need.[121] The program was supposed to provide 10,000 bundles (computers, software, training) to low-income families. However, the program shut down after just 2000 bundles had been distributed.[122]

EarthLink's plan was heavily negotiated. Important provisions included the following: EarthLink paid for and would own the network for a contract term of ten years; Wireless Philadelphia (the non-profit in charge of the network) would receive five percent of the subscriber fee or $1 per subscriber, whichever was greater; EarthLink would set its own rates (with one exception not germane here); the network was required to be open to competitors; upload and download speeds had to be identical at one megabit-per-second; Wireless Philadelphia was given 25,000 subsidized accounts (at $9.95/month) to distribute as it saw fit; and EarthLink had specific rates at which it could use public rights-of-way, or light-posts, to place wireless routers.[123] By all accounts, this was a restrictive agreement.[124]

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[119] *Id.* at 13-14.

[120] *Id.* at 21. One cannot fault Philadelphia for accepting the deal; it seemed too good to be true that Earthlink would build the network entirely on its own dime.

[121] Breitbart, *supra* note 114, at 27-28. That program no longer exists. E-mail from Greg Goldman, former Executive Director, Digital Impact Group (formerly Wireless Philadelphia) (Dec. 5, 2011, 9:47 PM) (on file with author).

[122] E-mail from Greg Goldman, former Executive Director, Digital Impact Group (formerly Wireless Philadelphia) (Dec. 5, 2011, 9:47 PM) (on file with author); *see* Nicole A. Ozer, *No Such Thing as "Free" Internet: Safeguarding Privacy and Free Speech in Municipal Wireless Systems*, 11 N.Y.U. J. LEGIS. & PUB. POL. 519, 530 (2008) (as of December 2007, 613 bundles had been provided); *Wireless Philadelphia Reboots to Bring Wi-Fi to the Masses*, PHILA. BUS. J. (Jan. 5, 2009, 12:00 AM), http://www.bizjournals.com/philadelphia/stories/2009/01/05/story8.html?page=all (as of June 2009, 1200 bundles had been provided).

[123] Breitbart, *supra* note 114, at 20.

Each additional restriction made it slightly more difficult for EarthLink to realize a profit.[125]

EarthLink and its corporate franchise model did not succeed. When EarthLink determined that it could no longer return a profit on the investment, it withdrew from its ten-year contract in 2008.[126] At the time, the project was thirty percent over budget, and a functional wireless system required double the access points per square mile as was predicted.[127] In addition, reception was spotty. Problems got worse as EarthLink laid off more than fifty percent of its workforce toward the end of the program.[128] At this point, failure was inevitable.

There is some good news: the network is now owned by the city. When EarthLink originally exited the market in early 2008, it offered the network to the city of Philadelphia for free. The city declined stating on-going maintenance would cost taxpayers too much.[129] Instead, local investors created a for-profit company, Network Acquisition Company (NAC), which purchased the network for $2 million.[130] NAC, and the network, was then purchased by the city of

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[124] Other private models have failed even without such restrictive agreements, such as Corpus Christi before the city bought the network back from EarthLink as seen above, or MetroFi in Portland, Ore. Jacqueline Emigh, *In Portland, Oregon, Another City-Wide Wi-Fi Network Bites the Dust*, BETANEWS (Feb. 22, 2008), http://betanews.com/2008/02/22/in-portland-oregon-another-city-wide-wi-fi-network-bites-the-dust.

[125] Mandated open access for a network completely funded by a private company, among other restrictions, contributed to EarthLink's retreat from the market a few years later.

[126] James Valvo, *Municipal Broadband's Record of Failure*, AMS. FOR PROSPERITY 2 (Mar. 2009), http://www.americansforprosperity.org/files/Municipal_Broadband_Policy_Paper.pdf.

[127] *Id.* This may have been a result of Philadelphia and EarthLink's overestimation of the ability of Wi-Fi to be "scaled up"—or rather, the ability of Wi-Fi to travel as far as the city needed it to. However, it is one of the few technologies not requiring a spectrum license from the Federal Communications Commission, so it is appealing for use in municipal networks. E-mail from Christopher Mitchell, Director of Telecommunications as Commons Initiative, Institute for Local Self-Reliance (Jan. 23, 2012, 12:11 PM) (on file with author).

[128] Ben Madgett, *Philadelphia: Salvaging the Future of Municipal Wireless*, REPORT BUYER (Apr. 3, 2008), http://www.reportbuyer.com/blog/philadelphia-salvaging-the-future-of-municipal-wireless.

[129] Chloe Albanesius, *Philadelphia Repurchases City Wi-Fi Network for $2M*, PC MAG. (Dec. 21, 2009), http://www.pcmag.com/article2/0,2817,2357395,00.asp#fbid=2Hw5Itpo KT.

[130] *Id.*

Philadelphia in late 2009 for $2 million.[131] The network still needed a $17 million investment, which the city has decided to undertake.[132] Those improvements are scheduled to be completed by 2013. Once complete, the network will be for government use only, though the city plans to expand it for public use in public spaces.[133] The city may eventually use it to increase revenue by partnering with government agencies and educational institutions.[134] However, the altruistic plan of maximum digital inclusion is no longer the primary goal.[135]

Philadelphia's wireless program was described as a failure of municipal wireless, generally attributable to some inherent inability of municipalities to provide Internet access.[136] Contrary to that assertion, and as discussed above, municipal wireless networks can be, and often are, successful.[137] This could indicate that Philadelphia's *plan* was the cause of the failure, and that private ownership is not sufficient. This was one particular attempt that did not succeed at first—an attempt with inadequate planning, too many restrictions on the private entity, and not enough public understanding or input. Future attempts could

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[131] Glenn Fleishman, *Philadelphia Will Buy Former EarthLink Wi-Fi Network*, WI-FI NET NEWS (Dec. 16, 2009), http://wifinetnews.com/archives/2009/12/philadelphia_will_buy_former_earthlink_wi-fi_network.html.

[132] Stephen Lawson, *Philadelphia Plans to Buy Its Wi-Fi Network*, PCWORLD (Dec. 18, 2009, 5:20 PM), http://www.pcworld.com/article/185118/philadelphia_plans_to_buy_its_wifi_network.html.

[133] *Id.* This would more closely track the successful plans discussed above (first, an I-net, then expansion).

[134] *Id.* Hopefully Philadelphia will learn from its past mistake and give the private entity a bit more room to profit. Or, better yet, perhaps it should try a partnership where everyone benefits in a sustainable way.

[135] *Id.* ("'The digital divide is still real, and it is still something that needs to be addressed. Perhaps that was not the model to address it, but it makes the cause no less worthy.' [said Douglas Oliver, city spokesman.]").

[136] *E.g.*, Steven Titch, *Beyond Municipal Wireless*, FOUND. ECON. EDUC., 34 (Oct. 2008), http://www.fee.org/pdf/the-freeman/0810FreemanTitch.pdf [hereinafter Titch, *Beyond*] (describing EarthLink's announcement to shut down its Philadelphia system as "[t]he final nail in the municipal wireless coffin"); Ian Urbina, *Hopes for Wireless Cities Fade as Internet Providers Pull out*, N.Y. TIMES (Mar. 22, 2008), http://www.nytimes.com/2008/03/22/us/22wireless.html. *But see* Craig Settles, *Don't Believe the Hype – Few Muni Broadband Networks Fail*, GOV. TECH. (Feb. 28, 2011), http://www.govtech.com/wireless/Few-Muni-Broadband-Networks-Fail.html.

[137] Corpus Christi, Minneapolis, Minn., and Fox Valley, Wis., are other examples of municipal wireless network successes.

use the same business model and be successful assuming the city and private entity plan the network adequately. That question, however, remains unanswered.

B. *St. Cloud, Fla.*

St. Cloud's municipal wireless network originated as a 2004 pilot project for a small residential and corporate campus called the "Stevens Plantation."[138] The pilot program, a free wireless Internet access program, was a success. It was very popular, and people became immediately dependent on it for Internet access. It even became a substitute for expensive private Internet access services. Seeing this success, the city decided to expand the network to cover the whole city. This led to the March 2006 launch of the city-wide wireless network called Cyber Spot.[139]

The city's original $2.5 million investment came from an Economic Development Fund it was required to use for this project.[140] The network was financed by the savings the city would receive by supplying municipal employees with free wireless Internet access rather than paying a private Internet provider.[141] Its recurring yearly costs, approximately $600,000, were paid from tax revenue.[142] Like other cities, the original goal was to develop the economy.[143] However, other uses became apparent, and St. Cloud extended the free wireless network to reach all seventeen square miles and 30,000 residents.[144]

Early reports indicated that many consumers were disappointed with the network. St. Cloud installed forty wireless access points per

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[138] *Tropos – Aptilo Case Study – St. Cloud, Florida*, TROPOS NETWORKS 1 (May 2008), http://www.tropos.com/pdf/success_stories/Tropos-Aptilo_0508.pdf.

[139] *Id.*

[140] *St. Cloud Wireless*, FREE PRESS, http://web.archive.org/web/20090106060325/http://www.freepress.net/communityinternet/stcloud (Archive.org screenshot taken Jan. 6, 2009).

[141] *Id.*

[142] *Tropos Case Study*, *supra* note 138.

[143] Will Raymond, *Municipal Wifi: St. Cloud on Cloud Nine*, CITIZEN WILL (Sept. 11, 2006, 10:51 PM), http://citizenwill.org/2006/09/11/municipal-wifi-st-cloud-on-cloud-nine.

[144] *Tropos Case Study*, *supra* note 138.

square mile, the highest density of access points at the time.[145] Despite that, it took only one month for users to complain about unsatisfactory performance. [146] Some patrons were continuing to subscribe to their old providers and used the municipal wireless as a supplement to that access.[147] Even some who could see routers from their houses were still unable to connect.[148] Some thought the service provided was "so far below the industry standard that citizens would rather pay the higher price than suffer through government mismanagement."[149] Others said this was an example of "government incompetence" because of the government's inability to adequately plan such a complex network.[150]

Hewlett-Packard, St. Cloud's customer service provider, told a different story. HP said out of more than 50,000 user sessions in the first forty-five days, only 842 help-line calls were received.[151] Others have indicated success as well: "[t]he St. Cloud Cyber Spot has had tremendous success, attracting 77 percent of its residents to use the network 6 months after its launch date. . . . Coverage is so reliable that some residents have decided to cancel their wired broadband service

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[145] David Haskin, *Who Has the Best Muni Wi-Fi Network?*, COMPUTERWORLD (Jan. 26, 2007, 12:00 PM), http://www.computerworld.com/s/article/9009260/Who_has_the_best_muni_Wi_Fi_network.

[146] *Wi-Fi City Sees Startup Woes*, WIRED (Apr. 23, 2006), http://www.wired.com/techbiz/media/news/2006/04/70720 [hereinafter *Startup Woes*].

[147] *Id.* Supplemental Wi-Fi access is not inherently bad, it can still be a useful service. However, one testimonial goes as follows, "At first, a desktop computer in Lusardi's house could use the Wi-Fi network with no problem, but his laptop would only work outdoors. Even then it was too slow and unreliable, so he kept his $20 per month Sprint DSL service. Now the desktop doesn't even work, and he's completely abandoned the idea of dropping his pay service and using the network. 'It's just total frustration,' Lusardi said. 'I'm going to stay with the DSL and just forget it, because I don't think it's going to work. Very few people are going to use it, and they're going to say it's underutilized and they're going to shut it down.'

[148] *Id.*

[149] Valvo, *supra* note 126, at 4.

[150] Titch, *Beyond*, *supra* note 136, at 36.

[151] *Startup Woes*, *supra* note 146. "Former Mayor Glenn Sangiovanni, who spearheaded the project, stressed that kinks were still being worked out, but noted that not everyone was having problems." *Id.* This may indicate that some of the disappointment was either anomalous or exaggerated, though the 50,000 sessions metric surely includes repeat log-ins.

at home, and are using the Cyber Spot for free."[152] Notably, consumer complaints appear to be based on the assumption that Cyber Spot was supposed to substitute for wired Internet service. That may not have been the intention: the city stated from the beginning that if consumers had problems with indoor Wi-Fi signals, they could improve the signal strength by purchasing a device that rebroadcasts signals.[153] This could indicate that the signal was not meant to substitute for in-home, wired Internet access.

Another indication that disappointment was exaggerated was that when Cyber Spot was to be shut down for "budget problems," citizens protested.[154] "St. Cloud residents of all stripes" wanted the service to stay.[155] One resident stated, "St. Cloud is not a hick town anymore . . . . We're country folks, but we're not backwards. One of the reasons for that is our Internet."[156] The protests worked for a time; the city council extended the Cyber Spot service for four months until January 2010.[157] However, no further extensions were granted. Today, the system has been suspended indefinitely.[158]

In its time, the network provided numerous economic benefits. Cyber Spot saved the citizens of St. Cloud approximately $3.7 million per year.[159] Building inspectors used the network to deliver building

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[152] *St. Cloud Wireless*, *supra* note 140 (though this overview does not list a publication date, it must be at least six months after the release of the wireless program, approximately September 2006).

[153] *Id.* These devices reportedly cost $170. Titch, *Beyond*, *supra* note 136, at 36. Wi-Fi signals are not meant to travel long distances, and the town is seventeen square miles.

[154] Esme Vos, *Angry Residents Prompt St. Cloud, Florida to Keep Free WiFi Service Running*, MUNIWIRELESS (Oct. 2, 2009), http://www.muniwireless.com/2009/10/02/st-cloud-keeps-wifi-running-for-4-months [hereinafter Vos, *Angry Residents*].

[155] Glenn Gleishman, *Heartbreak of Heartland, Again*, WI-FI NET NEWS (Dec. 28, 2009), http://wifinetnews.com/archives/2009/12/heartbreak_of_heartland_again.html.

[156] Vos, *Angry Residents*, *supra* note 154 (quoting resident Keith Harris) (internal quotation marks omitted). "Other residents argued that they depended on the service . . . to order medications, look for employment, pay bills or attend virtual high-school and college classes. All argued that they couldn't afford to pay for an Internet connection." *Id.*

[157] *Id.*

[158] *Cyber Spot*, CITY OF ST. CLOUD, http://www.stcloud.org/index.aspx?nid=402 (last visited Jan. 11, 2013).

[159] Esme Vos, *One Year Later, St. Cloud Citywide Wi-Fi Network Shows Impressive Results*, MUNIWIRELESS (Mar. 6, 2007), http://www.muniwireless.com/2007/03/06/one-

codes and work orders to laptops in the field, creating a more efficient government.[160] The network also provided non-economic benefits. The Mayor of St. Cloud stated that many of those who used the free wireless service were those who otherwise were not able to access the Internet.[161] In addition, the network allowed for ambulance telemetry and enhanced first responder support.[162]

Despite the numerous complaints detailed above, usage statistics after the first year were impressive. The network reached seventy-seven percent of the population, users logged 4,627,381 hours, and the average session length was 3.5 hours. The average monthly fee previously paid, and thus saved if the user dropped its service, was $36.47 per month.[163]

Of these five case studies, St. Cloud is the only network not currently functioning or with plans to function in the near future. If St. Cloud were to bring the program back, it would have to respond to its citizens' complaints and potentially upgrade the network for it to have the intended benefits. Otherwise, it would receive similar backlash. Perhaps responding to those complaints would be too costly or might preclude the city from reviving the system. Perhaps it would inspire the city to sell the existing network to a private company from which it might be able to extract profit. In any event, it currently looks as if the city is unlikely to revive the program as in Philadelphia.[164]

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year-later-st-cloud-citywide-wi-fi-network-shows-impressive-results [hereinafter Vos, *One Year Later*].

[160] *Tropos Case Study*, *supra* note 138, at 1-2.

[161] Esme Vos, *St. Cloud Shuts down Free Citywide WiFi Service*, MUNIWIRELESS (Sept. 28, 2009), http://www.muniwireless.com/2009/09/28/st-cloud-shuts-down-free-citywide-wifi-service.

[162] Raymond, *supra* note 143.

[163] Vos, *One Year Later*, *supra* note 159.

[164] The City of St. Cloud intended to include a referendum in November 2010 to potentially revive the program. But the St. Cloud website states Cyber Spot is still in suspension. *Cyber Spot*, *supra* note 158; *see* Press Release, City of St. Cloud, St. Cloud Residents to Vote on Cyber Spot in November, Mar. 26, 2010, *available at* http://www.stcloud.org/documents/18/184/03_032610_Nov_ballot_to_include_CyberSpot.pdf.

IV. HISTORY'S GUIDE

These case studies can provide guidance for municipalities considering providing their own broadband service. As mentioned above, the decision of whether to provide broadband is necessarily an intricate and fact-specific determination for each municipality. For a municipality to provide broadband there must be some persuasive reason to do so. Perhaps private actors either do not exist; or they do exist, but provide poor service. Maybe there is a significant digital divide in the community that the private entity has been unable to bridge, or the area is in need of the social and economic benefits that municipal broadband networks provide.[165] In any case, planning is an essential element to constructing a successful municipal network.[166]

These case studies offer guidance in two general areas. The first is what type of business model municipalities should consider. The second is how to bring the network from idea to execution and beyond. Each will be discussed in turn.

A. *The Business Model*

The question of what business model to employ is a difficult one. There are many choices, each with its own benefits and costs. For instance, the executive committee for Philadelphia reviewed five potential business models.[167] The committee recommended public-private partnership, but the city chose the purely private business model because of its own special circumstances. Careful attention must be paid to the business model, or a city could easily fall into Philadelphia's position and choose a model that does not actually work for it.

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[165] This will require the municipality to determine whether the state has banned or placed restrictions on the municipal provision of broadband. The Supreme Court allowed states to ban, or erect barriers to entry for, municipal Internet access in Nixon v. Missouri Municipal League, 541 U.S. 125 (2004). An excellent aggregation of these state laws is compiled by the Baller Herbst Law Group, *supra* note 15; *see generally* NULL, *supra* note 17.

[166] MITCHELL, *supra* note 4, at 54 ("The most successful communities have taken more time in planning and picking their partners . . . to ensure they will be able to overcome challenging obstacles. . . . Good luck seems to come to those who prepare for it.").

[167] *See supra* note 114, at 14 and accompanying text. It should be noted that business models come in many different varieties, and the models reviewed by Philadelphia's executive committee represent only a handful. For more discussions, view Bar & Park, *supra* note 5, 113-19.

The case studies discussed above exemplify two extremes. The first section will discuss the purely private model, where the network is wholly owned by the private Internet service provider. The second section will discuss the purely public model, where the municipality owns the network in its entirety, whether as a public utility or in some other fashion. The third section will then discuss the public-private partnership that was ultimately rejected by Philadelphia, but may be the best model for some cities.

1. *Purely Private Business Models*

A purely private municipal Internet access model involves a private entity paying for and owning the network.[168] The private entity then provides Internet access to citizens on its own terms with minimal municipal involvement. The city's role primarily consists of working with the private entity to provide access to its rights-of-way, including light poles or the right to lay fiber cables under streets or other property.[169] Because the entity will be purchasing these rights-of-way in bulk, it can potentially receive a favorable rate. The city could also negotiate lower rates for Internet access for its own employees, agencies, and other bodies. The Philadelphia plan essentially embodies the private model.[170]

This model can be extremely attractive. It relieves the city of the burden of running the network or investing heavily in infrastructure, and it allows the municipality to rely on the knowledge, expertise, and skills of the private provider to run an efficient and functional network. [171] There is no one-size-fits-all training for municipal employees for running a network. Engineers in each city must have skills finely tuned to its own municipality's demands and

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[168] Breitbart, *supra* note 114, at 13.

[169] Bar & Park, *supra* note 5, at 117.

[170] Breitbart, *supra* note 114, at 13. Some believed the Philadelphia model was a public-private partnership. *See, e.g.*, Craig Dingwall, *Municipal Broadband: Challenges and Perspectives*, 59 FED. COMM. L.J. 67, 94 (2006). Others believed the deal more closely resembled a purely private model. Breitbart, *supra* note 114, at 21-22 ("[A]fter [Wireless Philadelphia] specifically reject[ed] the private franchise option . . . Wireless Philadelphia accepted a proposal for a private franchise [with EarthLink]."). The Philadelphia plan was unique in that it had contract provisions that looked much like provisions one would see in a public-private partnership, but Philadelphia had very little involvement in the entire project. For all intents and purposes, the deal was for private ownership.

[171] Techatassanasoontorn, *supra* note 16, at 584.

circumstances.[172] Private providers could be better at handling that kind of support role. But this is just one benefit of the purely private model, where it might otherwise fail because of its shortfalls.

The purely private model is a difficult model with which to succeed because of the private entity's emphasis on the short-term bottom-line. While it has the relevant network expertise, one problem is that the private entity shoulders the entire fiscal burden: the infrastructure, access to rights-of-way, the equipment, and running the business. As discussed before, the Internet access market can be characterized as a natural monopoly, with very high up-front costs. As a result, investing in infrastructure is an inherently long-term investment. Early profitability is unlikely, short-term losses should be expected, and short-term losses are more easily weathered by larger entities. Philadelphia's story reinforces this point: a medium-sized Internet provider, such as EarthLink, is less likely to succeed if the municipality adopts a purely private model. This is also true if the city partners with a much smaller provider such as Portland, Oregon's MetroFi.[173]

EarthLink was a risky choice for Philadelphia; it did not have the resources that incumbents such as AT&T and Verizon had. [174] Philadelphia could have chosen a larger entity as its partner to gain the benefits of significant cash flows and ability to handle a significant amount of risk. It did not, which may have contributed to the failure of the network. Incumbents tend to like this model *because* they are often the only entity that can afford the inherent risks.[175] Even when large incumbents lose the bid, smaller companies will often fail because they cannot shoulder the burden.[176]

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[172] *Id.*

[173] Portland's venture with MetroFi failed in 2008. Mike Rogoway, *MetroFi Sets Date to Turn off Bay Area Networks*, OREGONLIVE BLOG (May 29, 2008), http://blog.oregonlive.com/siliconforest/2008/05/metrofi_sets_date_to_turn_off.html.

[174] John Blevins, Death of the Revolution: The Legal War on Competitive Broadband Technologies, 12 YALE J. L. & TECH. 85, 115 (2010).

[175] *Id.* at 114. Professor Blevins makes these remarks when discussing the public-private partnership, but his definition of that term is much closer to what this paper describes as the purely private model.

[176] *Id.*

To make matters worse for the private entity, municipal networks are accompanied by many social benefits—or positive externalities.[177] That is part of the reason some municipalities choose to offer it themselves. By definition, these externalities are not internalized by the private actor. EarthLink could not monetize or internalize the time saved and the inconvenience avoided by use of the Wellmont tele-medicine system, as was made possible by BVU's services. Any private entity seeking to build a municipal network as a private actor would have to ignore those benefits. If the provider *could* internalize those benefits, its profits would be higher and it could be more successful. The inability to fully realize these social benefits makes success that much more difficult. While this may be true for every privately built network (not just those affiliated with municipalities), municipal involvement in providing Internet access is arguably *supposed* to capitalize on those social, as well as economic, benefits.

The private model offers insignificant advantages over other models. Perhaps a private entity may benefit through a friendly relationship to a municipality and therefore receive a discount for access to rights-of-way. But the model is plagued with the same problem that confronts rural municipalities: an inability to attract private entities to build infrastructure. Therefore, an analysis of the purely public ownership model is required.

2. *Purely Public Business Models*

A purely public model usually involves a public utility providing Internet access in a way similar to municipal provision of gas, electric, and heat, among other things. The public utility would finance the build-out of the network, as well as run the business of providing Internet access to customers. This would allow the municipality to leverage its existing resources in order to acquire subscribers and provide adequate customer service, support, and billing.[178] In other words, the public provider can use its goodwill to attract a customer base.[179]

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[177] Lawrence Lessig, *Why Your Broadband Sucks*, WIRED (March 2005), http://www.wired.com/wired/archive/13.03/view.html?pg=5. Social benefits were discussed in each section regarding each municipality as well. These often include bridging the digital divide, increasing quality of life, and providing access to important online functions.

[178] Bar & Park, *supra* note 5, at 115.

[179] MITCHELL, *supra* note 4, at 48.

Purely public models fared better in these case studies. Bristol, Corpus Christi, Santa Monica, and now perhaps Philadelphia, were successful networks that were publicly owned and operated. The obvious benefit to choosing public ownership is that the municipality can run the network purely in the public interest.[180] This may require educating the public because the public might care more, at first, about the network turning a profit rather than intangible social benefits that are difficult to quantify. In addition, if the city has excess capacity over its existing cables, that capacity could be leased and used to power a free Wi-Fi network, or it could be used to support an I-net to increase governmental efficiencies. The detriment is that the municipality generally must run the business (if state law allows it). This requires not only an increase in payroll, but also handling any adverse consequences of disappointing its citizens, as seen in St. Cloud, Fla. The public model also requires accurate planning for fear of exacerbating the age-old generality that governments are inefficient and inadequate service providers.[181]

It is a risk for a municipality to run a network. But in some cases the payoff is worth that risk. In Bristol, Va., next-generation networks were unlikely to materialize without BVU. Because BVU ran the business, it employed local citizens who cared on a deeper level about the functioning of the network and the happiness of its customers. Santa Monica's ownership of its fiber allowed it to open the network to competitors, something most telecom and cable companies are not required to do, which reduced private subscription rates to the benefit of many citizens. Santa Monica was also able to respond to a specific need of its community: lower-cost Internet service for local businesses. When it learned its ten gigabit service was not satisfactory to many of its smaller local businesses, it found a solution by getting slower and cheaper connections for them. On the other hand, in the typical local marketplace where there are perhaps one or two competitors for wired Internet service, a private entity would be less likely to find a solution for specific end-users because it simply does not need to. If that entity is one of the only providers in town, and has

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[180] There are two main types of public ownership: the "civic wireless" model, and the public utility model. Breitbart, *supra* note 114, at 13. This section focuses on the public utility model.

[181] Techatassanasoontorn, *supra* note 16, at 573. For obvious reasons, those opposed to municipal broadband (big telecom companies, big cable companies, those that disfavor government-provided services ideologically) often exaggerate this idea.

no tie to its customers other than through a monthly fee, it would likely be too costly for it to respond to such specific demands.

The public business model has its benefits. Though, from a municipality's perspective, the risk may simply be too great. If the network is unsuccessful, the municipality is solely to blame for substantial sunk costs that are unlikely to be recouped. For an obvious example, look at St. Cloud, Fla. The network has been turned off since early 2010. There appears to be no intention to sell the network infrastructure that was already built (forty wireless access points per square mile!). Those sunk costs will likely never be recouped short of a sale or reinvigorating the network itself. For a different approach, municipalities should look to a public-private partnership.

3. *Public-Private Partnership*

For purposes of this Article, a public-private partnership exists when the municipality pays for and builds the infrastructure, and allows private entities to lease network access from the municipality at wholesale rates, and then supply Internet access to consumers at retail rates.[182] The public-private partnership model is considered a balance between total municipal control and total private control. On some level, the model appeals to both sides of the argument because both the municipality and the private entity "have the potential to profit greatly from a successful . . . endeavor."[183] Some have concluded the public-private business model is the "most efficient."[184] It is true that both municipalities and private entities benefit from this model: the municipality has ownership and control of the network itself; and private entities do not have to invest in expensive infrastructure.

Public-private partnerships allow the municipality to design, fund, and implement the network. The municipality then leverages its position as owner and operator of the network to negotiate with private providers.[185] In this model, the municipality is not confined to

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[182] Bar & Park, *supra* note 5, at 115 (described as municipality as "wholesaler" of capacity); Breitbart, *supra* note 114, at 13. Because this is not reminiscent of the deal struck in Philadelphia, that case study does not provide helpful guidance for this model.

[183] Michael J. Santorelli, *Rationalizing the Municipal Broadband Debate*, 3 ISJPL 43, 70 (2007).

[184] *Id.* at 73.

[185] FEDERAL TRADE COMMISSION STAFF REPORT, MUNICIPAL PROVISION OF WIRELESS INTERNET 15 (Sept. 2006), *available at* http://www.ftc.gov/os/2006/10/V060021municipalprovwirelessinternet.pdf.

one private entity as partner. The municipality could impose an "open access" requirement allowing the municipality to resell network access to any number of providers if it wanted.[186] Without a restriction on the number of competitors, the municipality can more easily respond to local conditions. For instance, if subscription rates are too high, the municipality can attempt to find more competitors to drive prices down and perhaps increase revenue to the city. Alternatively, a municipality could impose frequent contract renegotiations. The idea would be that the parties respond to the success or failure of particular provisions or requirements quickly. The end result is a maximally successful private entity.

The municipality's role is limited after the negotiation stage. Once the contract is negotiated, the private entity makes the fine-grained business decisions, including handling the customer support and billing, and also accepts most of the risk in running the business. Municipalities benefit from this because they generally do not have good reputations for business acumen, and many municipalities will be happy not to have to run the business (all the while earning crucial revenue). Municipalities also benefit from lower telecommunications costs.[187] However, some municipalities may not like giving up control over the user experience, and those cities should account for that in any contract negotiation.

From a theoretical standpoint, this model is very attractive. It is designed to combine the most favorable aspects from both the purely public and the purely private models. Municipalities can handle large, up-front capital investment and can ensure the network runs in the public interest. If it is an unserved, "Greenfield"[188] area, this model

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[186] *Id.* However, it is sometimes difficult for municipalities to attract the larger telecoms and phone companies because they prefer to be monopolies in the areas they serve. Changing that mentality would be difficult. E-mail from Christopher Mitchell, Director of Telecommunications as Commons Initiative, Institute for Local Self-Reliance (Jan. 23, 2012, 12:11 PM) (on file with author). As a side note, the municipality could also impose a network neutrality requirement. *See* Eric Null, *Public Ownership of Networks Can Solve Broadband Policy Fights*, MUNINETWORKS (Feb. 19, 2012), http://www.muninetworks.org/content/public-ownership-networks-can-solve-broadband-policy-fights.

[187] Bar & Park, *supra* note 5, at 115.

[188] "Greenfield" development means the property is undeveloped, and "Brownfield" means the property has previously been developed. Glossary, BROWNFIELDS CENTER AT THE ENVTL L. INST., http://www.brownfieldscenter.org/big/glossary.shtml (last visited Nov. 22, 2011). In the broadband context, I will use "Greenfield" to mean areas where there is no incumbent broadband provider and no previously existing broadband infrastructure, and "Brownfield" where there is pre-existing broadband infrastructure.

can provide the incentive for a private entity to provide Internet access. Then, the municipality can rely on the private entity's expertise to provide the Internet service and ensure functionality. Both have the ability to negotiate at arm's length for a contract that benefits both sides. The detriments will likely come in the execution. A corporation is accountable to its shareholders. Thus, it has an incentive, and perhaps obligation, to increase its revenue. As a private entity loses the ability to control the network, the entity stands to lose revenue. For that reason, private providers do not like open access networks, and incumbents that are accustomed to being monopoly providers will not welcome such a regime change. Therefore, the municipality may have to fight vehemently to keep what control it would like to keep. Alternatively, the private provider may try persuading the municipality to concede other salient contract terms in exchange for its increased control. Depending on the concessions, the public may benefit less than it would if the municipality were to provide Internet access itself.

It is clear why a municipality would be drawn to this business model. Municipalities that decide a public-private partnership is best should be ready for intense contract negotiations. It should determine what its priorities are for those negotiations and should be reluctant to concede them. If the private entity requires the municipality to concede some of its salient contract terms, then the municipality should try negotiating with other private entities, if the options exist. Another entity may accept the municipality's original terms, perhaps resulting in increased public benefit.

B. *Growth of the Network*

1. *"Greenfield" or "Brownfield"?*

At the outset of the growth discussion, an important question for municipalities is whether "Greenfield" or "Brownfield" build-out is favored or if there are any problems with either. Greenfield municipalities are confronted with the question of whether high-speed Internet access should be provided to its citizens in the first instance. Greenfield municipalities may have a richer incentive—i.e. the only way for citizens to have access to high-speed Internet is for the municipality to provide it in some way. Therefore, the municipality determines whether the city should gain the significant economic and social benefits that accompany citywide broadband in the first instance.

For a Greenfield municipality, it is easier to make the argument that the municipality should become involved in high-speed network provision. Fiber optic connections are the wave of the future.[189] A town with no Internet access at all is hurting itself by refusing to get involved. The Internet is a gateway to democratic participation, debate, and staying informed in local and national news. Providing this benefit would be a significant boon for the municipality and its citizens. It could also streamline many municipal services, as happened in Corpus Christi, Tex.

"Brownfield" municipalities, such as Philadelphia and Santa Monica, are confronted with the question of whether current high-speed Internet access prices are so expensive, or the service so inadequate, that the municipality should overbuild.[190] Certainly in some cases, like Santa Monica, prices are so high that the municipal overbuild is worth the investment, which includes vast social benefits not directly accounted for. If fiber optic connections are the goal, then a city with merely Digital Subscriber Line or dial-up access to the Internet is hurting itself as socially and economically beneficial innovations at the edges require faster connections. A private, monopolistic or oligopolistic provider is unlikely to make improvements on its own. That is potentially where the municipality becomes involved.

Unlike Greenfield build-out, Brownfield requires a much more intricate determination. It arguably requires a deeper understanding of the high-speed Internet market within the municipality. For the municipality to justify becoming involved in the market, its provision would most likely have to significantly reduce prices in the area or provide significant economic and social benefits that currently are not provided. In Santa Monica, local businesses saved 67.6 percent on their Internet bills by switching to the city's service—obviously, the municipal network was worth the cost in that area. If the price or quality reduction were lower, perhaps five or ten percent, the network may not be worth the time and investment, without significant social benefits included (for instance, tele-health or distance education

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[189] YOCHAI BENKLER ET AL., NEXT GENERATION CONNECTIVITY: A REVIEW OF BROADBAND INTERNET TRANSITIONS AND POLICY FROM AROUND THE WORLD 63 (Feb. 2010); Susan P. Crawford, *Transporting Communications*, 89 B.U. L. REV. 871, 928 (2009).

[190] It should be noted that, in some instances, depending on the type of technology used, it may not even be considered an "overbuild." For instance, for a municipality building a next-generation fiber optic network where only DSL or cable existed before, that would be "no more redundant than interstate highways being built over dirt roads." MITCHELL, *supra* note 4, at 49.

programs). This reduction also brought about a twenty percent reduction in competitor pricing, a significant benefit for many, even for those businesses that did not make the switch. The network's social benefits, including tele-medicine and allowing for a more efficient system for Hollywood directors, further justified the city's investment. For larger Brownfield municipalities, close attention must be paid to the economic and social benefits that will actually be realized to determine whether municipal broadband is appropriate.[191] In some cases, it may be prudent to build an I-net in order to save the municipality itself from exorbitant bulk connection costs of private providers, and leave residential broadband provision to the private entities.

A Brownfield municipality is arguably more susceptible to legal challenge by incumbents as well.[192] Private entities feel threatened by government competition; they often view it as unfair.[193] As seen in Bristol, there are numerous channels through which an incumbent may challenge the municipality, including at the state legislature lobbying for restrictive laws, or through the court system enforcing applicable laws.[194] Unless the state legislature comes through like the Virginia legislature did for Bristol (rather than going in the opposite direction by erecting more barriers for municipal networks like in South Carolina),[195] any Brownfield municipality will surely encounter stringent opposition. For that, it should be prepared legally, mentally, and monetarily.

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[191] In large metropolitan areas, it is more likely that there is more competition because there are, in some sense, fewer barriers to entry. Higher population density could increase revenues and reduce costs, as fewer towers or fewer physical lines need to be built. This would slightly undermine the municipality's justification for entering the market, as the social and economic benefits would likely be slight compared to costs.

[192] This being said, incumbents do not want to set precedent anywhere in the country that would threaten their control over the market. Therefore, any municipal network will likely be attacked, at least in the state legislature.

[193] HAROLD FELD ET AL., CONNECTING THE PUBLIC: THE TRUTH ABOUT MUNICIPAL BROADBAND 4 (April 2005), *available at* http://www.freepress.net/files/mb_white_paper.pdf. Presumably, some of this unfairness comes from the municipality's ability to take a loss or cross-subsidize the cost, and thus charge low subscription rates, without the same repercussions as a private business. This is the basis for many laws that prevent such behavior by municipalities.

[194] *See* Baller, *supra* note 15.

[195] Cyrus Farivar, *South Carolina Passes Bill Against Municipal Broadband*, ARS TECHNICA (June 29, 2012), http://arstechnica.com/tech-policy/2012/06/south-carolina-passes-bill-against-municipal-broadband.

Ultimately, there is no satisfying answer to which type of build-out is more favorable. Both require high up-front investment in the network, both can provide significant social benefits, and both require difficult decisions to be made. These case studies do not provide effective guidance on this point either; both types are represented, and both have failed *and* succeeded. It comes down to the factual determinations made by the municipality itself. The relative merits of each type must be deliberated and decided at the outset, and they must be continually reevaluated as the network plan comes to fruition.

2. *First, an I-net*

The Bristol and Corpus Christi municipal systems began as institutional networks, designed purely for the use of the municipality and its employees. The goal was to improve municipal functions, reduce costs, and streamline government over the long-term. This easing-into the market can be a good "beta" test. It allowed the municipality to determine whether the network was functional and where problems existed. Once those problems were solved, those same systems were expanded to provide Internet access to thousands of wanting citizens and to help bridge the digital divide. If those cities spent millions of dollars on a citywide high-speed Internet access plan at the outset, without first testing demand and functionality, it could have been as disastrous, as in Philadelphia. Instead, the networks grew slowly in response to industry and consumer demands, and the growth was dictated by the municipalities' abilities to handle the larger network. As BVU's Wes Rosenbalm insinuated, creating a municipal network for the sake of novelty can present problems in execution.

The establishment of an I-net requires the municipality to ensure that the I-net will provide benefits to the government that justify the investment. Given the numerous benefits discussed in these case studies, it is easy to conclude that I-nets can provide benefits so long as they are executed correctly. I-nets can streamline government functions, increase employee safety (no more dog bites), and they can even allow for telecommuting if certain jobs are conducive to that kind of work—saving gas costs and the environment. From there, growth of the network should be naturally determined by industry, consumer demand, and the municipality's ability to invest.

V. CONCLUSION

Whether a municipal network will succeed for a particular municipality is ultimately a determination that should be made on a case-by-case basis, with all of the facts in front of the decision-maker. The decision should be methodical: is there a goal, such as bridging the digital divide, to justify a municipal broadband network? Does the municipality itself need it? Next, a more fine-grained analysis is required. What type of business model and financing will work for the municipality? Does it have surplus cash that it can invest in a network? Who will provide outside help if needed? In answering all of these questions, municipalities can learn from previous attempts at similar networks.

In the coming years, municipalities also will have to consider the new, highly increased demand for Wi-Fi connections. Whether a municipal area is adequately covered by a wireless connection is another issue that should be discussed as part of the planning stage. Perhaps even a place like New York City, counterintuitively, is not adequately covered despite numerous potential connections because it is so densely populated. [196] Again, this is another fact-specific determination to be made by the municipality in the planning stage.[197] This topic is intricate and requires an in-depth discussion; I will leave it for a later article to do it justice.[198]

As this Article highlights, deploying a municipal network is a significant undertaking. It is technical, political, and complex. But, it can be done. Philadelphia's municipal broadband plan did not kill the municipal broadband dream, but ignoring history could.

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[196] Holman W. Jenkins, Jr., *Wi-Fi and the Mobile Meltdown*, WALL ST. J. (Oct. 18, 2011, 7:00 PM), http://online.wsj.com/article/SB10001424052970204479504576639010866537594.html.

[197] It should be kept in mind that all wireless networks require a wired connection to power it, and any plans for a Wi-Fi service will require a wire build-out or lease of wired capacity.

[198] One such article is François Bar & Namkee Park, *Municipal Wi-Fi Networks: The Goals, Practices, and Policy Implications of the U.S. Case*, 61 COMMUNICATIONS & STRATEGIES 107 (2006).